



OBSL1 gene

obscurin like 1

Normal Function

The *OBSL1* gene provides instructions for making a protein that is thought to help maintain normal levels of another protein called cullin-7, which is produced from the *CUL7* gene. The cullin-7 protein plays a role in the ubiquitin-proteasome system, which is the cell machinery that breaks down (degrades) unwanted proteins.

Cullin-7 helps assemble a complex known as an E3 ubiquitin ligase. This complex tags damaged and excess proteins with molecules called ubiquitin. Ubiquitin serves as a signal to specialized cell structures known as proteasomes, which attach (bind) to the tagged proteins and degrade them. The ubiquitin-proteasome system acts as the cell's quality control system by disposing of damaged, misshapen, and excess proteins. This system also regulates the level of proteins involved in several critical cell activities such as the timing of cell division and growth. In particular, the *OBSL1* protein and cullin-7 are thought to help regulate proteins involved in the body's response to growth hormones, although their specific role in this process is unknown.

Health Conditions Related to Genetic Changes

3-M syndrome

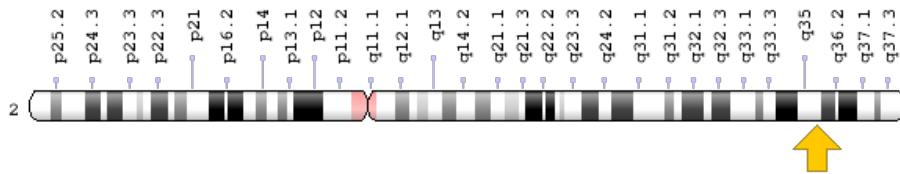
At least 29 mutations in the *OBSL1* gene have been identified in people with 3-M syndrome, a disorder that causes skeletal abnormalities including short stature (dwarfism) and unusual facial features. Most of these mutations substitute one protein building block (amino acid) for another amino acid in the *OBSL1* protein or result in an *OBSL1* protein that is abnormally short and nonfunctional.

Mutations in the *OBSL1* gene likely lead to reduced cullin-7 protein levels, preventing cullin-7 from bringing together the components of the E3 ubiquitin ligase complex and interfering with the process of tagging unneeded proteins for degradation. The body's response to growth hormones may be impaired as a result. However, the specific relationship between *OBSL1* gene mutations and the signs and symptoms of 3-M syndrome are unknown.

Chromosomal Location

Cytogenetic Location: 2q35, which is the long (q) arm of chromosome 2 at position 35

Molecular Location: base pairs 219,549,408 to 219,571,573 on chromosome 2 (Homo sapiens Updated Annotation Release 109.20200522, GRCh38.p13) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- KIAA0657
- obscurin-like protein 1 isoform 1 precursor
- obscurin-like protein 1 isoform 2 precursor
- obscurin-like protein 1 isoform 3 precursor

Additional Information & Resources

Educational Resources

- The Cell -- A Molecular Approach (second edition, 2000): The Ubiquitin-Proteasome Pathway
<https://www.ncbi.nlm.nih.gov/books/NBK9957/#A1233>

Clinical Information from GeneReviews

- Three M Syndrome
<https://www.ncbi.nlm.nih.gov/books/NBK1481>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28OBSL1%5BTIAB%5D%29+OR+%28obscurin+like+1%5BTIAB%5D%29%29+OR+%28%28KIAA0657%5BTIAB%5D%29+OR+%28obscurin-like+protein+1+isoform+1+precursor%5BTIAB%5D%29+OR+%28obscurin-like+protein+1+isoform+2+precursor%5BTIAB%5D%29+OR+%28obscurin-like+protein+1+isoform+3+precursor%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D>

Catalog of Genes and Diseases from OMIM

- OBSCURIN-LIKE 1
<http://omim.org/entry/610991>

Research Resources

- ClinVar
<https://www.ncbi.nlm.nih.gov/clinvar?term=OBSL1%5Bgene%5D>
- HGNC Gene Symbol Report
https://www.genenames.org/data/gene-symbol-report/#!/hgnc_id/HGNC:29092
- Monarch Initiative
<https://monarchinitiative.org/gene/NCBIGene:23363>
- NCBI Gene
<https://www.ncbi.nlm.nih.gov/gene/23363>
- UniProt
<https://www.uniprot.org/uniprot/O75147>

Sources for This Summary

- Clayton PE, Hanson D, Magee L, Murray PG, Saunders E, Abu-Amero SN, Moore GE, Black GC. Exploring the spectrum of 3-M syndrome, a primordial short stature disorder of disrupted ubiquitination. *Clin Endocrinol (Oxf)*. 2012 Sep;77(3):335-42. doi: 10.1111/j.1365-2265.2012.04428.x. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/22624670>
- Hanson D, Murray PG, Black GC, Clayton PE. The genetics of 3-M syndrome: unravelling a potential new regulatory growth pathway. *Horm Res Paediatr*. 2011;76(6):369-78. doi: 10.1159/000334392. Epub 2011 Nov 29. Review.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/22156540>
- Hanson D, Murray PG, Coulson T, Sud A, Omokanye A, Stratta E, Sakhinia F, Bonshek C, Wilson LC, Wakeling E, Temtamy SA, Aglan M, Rosser EM, Mansour S, Carcavilla A, Nampoothiri S, Khan WI, Banerjee I, Chandler KE, Black GC, Clayton PE. Mutations in CUL7, OBSL1 and CCDC8 in 3-M syndrome lead to disordered growth factor signalling. *J Mol Endocrinol*. 2012 Oct 30;49(3):267-75. doi: 10.1530/JME-12-0034. Print 2012 Dec.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/23018678>
- Hanson D, Murray PG, Sud A, Temtamy SA, Aglan M, Superti-Furga A, Holder SE, Urquhart J, Hilton E, Manson FD, Scambler P, Black GC, Clayton PE. The primordial growth disorder 3-M syndrome connects ubiquitination to the cytoskeletal adaptor OBSL1. *Am J Hum Genet*. 2009 Jun; 84(6):801-6. doi: 10.1016/j.ajhg.2009.04.021. Epub 2009 May 28.
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/19481195>
Free article on PubMed Central: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2694976/>
- Holder-Espinasse M. 3-M Syndrome. 2002 Mar 25 [updated 2012 Jan 26]. In: Pagon RA, Adam MP, Ardiserger HH, Wallace SE, Amemiya A, Bean LJH, Bird TD, Ledbetter N, Mefford HC, Smith RJH, Stephens K, editors. *GeneReviews® [Internet]*. Seattle (WA): University of Washington, Seattle; 1993-2017. Available from <http://www.ncbi.nlm.nih.gov/books/NBK1481/>
Citation on PubMed: <https://www.ncbi.nlm.nih.gov/pubmed/20301654>

- Huber C, Fradin M, Edouard T, Le Merrer M, Alanay Y, Da Silva DB, David A, Hamamy H, van Hest L, Lund AM, Michaud J, Oley C, Patel C, Rajab A, Skidmore DL, Stewart H, Tauber M, Munnich A, Cormier-Daire V. ODSL1 mutations in 3-M syndrome are associated with a modulation of IGFBP2 and IGFBP5 expression levels. *Hum Mutat.* 2010 Jan;31(1):20-6. doi: 10.1002/humu.21150. *Citation on PubMed:* <https://www.ncbi.nlm.nih.gov/pubmed/19877176>
 - OMIM: OBSCURIN-LIKE 1
<http://omim.org/entry/610991>
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